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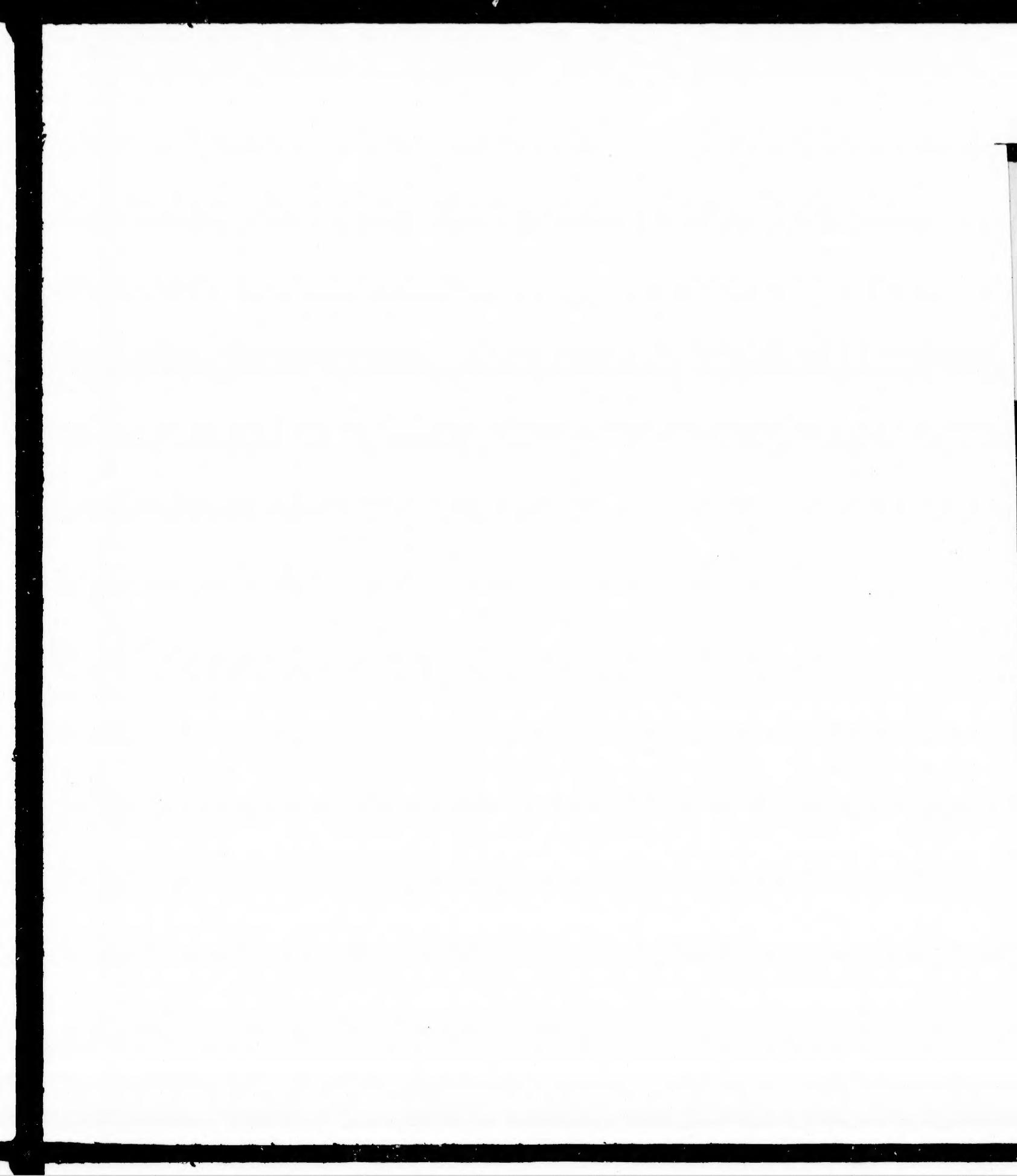
UNDER WHAT CIRCUMSTANCES THEY INCREASE UN-
DULY—WHAT INSECTS TO SPARE—WHAT TO KILL.
AND HOW TO KILL THEM—with other
USEFUL INFORMATION.

BY REV. T. W. PYLES, COR. MEM. OF THE NAT. HIST. SOC.,
MONTREAL.

*Reprinted from the Fourth Report of the Montreal
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SOME OF THE INSECTS THAT FREQUENT THE
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Shall we wage indiscriminate war against insects?

"The noxious insect that intrudes may die." This is the judgment of the poet Cowper, and it appears to be a reasonable one; but we must not suppose that every insect is noxious, nor must we regard every appearance of an insect as an intrusion. It is well for the Fruit-grower and the Horticulturist to acquire a knowledge of Entomology, that they may be able to destroy *judiciously*. An indiscriminate slaughter of insects is an offence against Nature, "who, when she formed, designed them an abode."

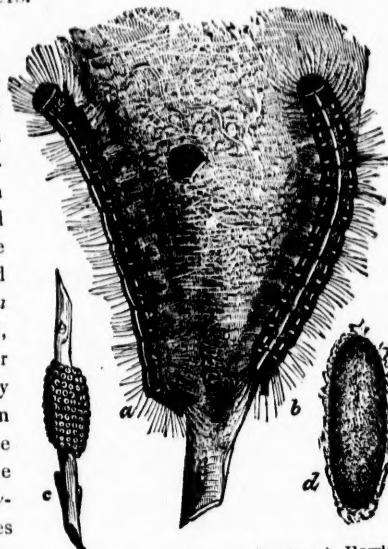
Consider the case of the caterpillar of the Willow-herb Sphinx (*Deilephila Chamaenerii*):—

In neglected spots and corners the Willow-herb (*Epilobium angustifolium*) is wont to spring up. Feeding on this plant certain caterpillars of a formidable appearance, of a green or madder-brown hue, having two rows of orange spots down the back, and an anal horn, may often be met with. They grow to a considerable size. The ordinary gardener finding them would certainly kill them. But they are perfectly innocent. Their food-plant is of no value. The moth which they ultimately produce is very beautiful; and, being one of the nectar-sipping insects, plays a useful part in the economy of nature by scattering pollen to aid in the fertilization of plants. A person killing the insect is not merely guilty of an act of unnecessary cruelty: he is destroying a friend.

Caterpillars found feeding on weeds, like those of *Vanessa Milberti* on Nettles, and *Danais Archippus* on Silk-weed should not be killed. The probability is that they will eat *nothing* but weeds.

HOW TO DESTROY INSECTS.

To destroy the troublesome *Clisiocampa Americana*, the best plan is to look, in the winter, for the patches of eggs on the twigs of the apple-trees, and to remove them with the thumb-nail, and then cast them into the fire. The red-humped caterpillars of *Notodonta concinna* will be found, in the early stages of their growth, lying closely packed, side by side, on a few of the leaves of the apple-tree. So will the striped caterpillars of *Pygæra ministra*. The leaves so occupied should be picked and trodden with their burdens under foot. A free use of hellebore dissolved in water, and applied by means of the water-can and rose, will free the berry bushes and canes from the larvæ of Saw-flies and Geometrina. The war against Aphides should commence as early in the year as possible; for it should be borne in mind, that only every eighth or ninth generation of plant-lice indulges in connubiality. Winged males and females appear in the Autumn, (or early Spring). All the succeeding broods consist of wingless females, to the eighth generation. Males then appear again, to reorganize Aphidean society for another succession of broods. A little cluster of plant-lice, overlooked, will increase and widen its operations,



Tent Caterpillar (*Clisiocampa Americana*)—Harris.

a, b, larvæ; c, cluster of eggs; d, cocoon.

Vanessa
ould not
weeds.

till at length a whole plant will suffer; whereas an early removal of it would have freed the plant for the whole season. The larger caterpillars should be carefully "hand-picked."

HOW IS IT THAT INSECTS SOMETIMES INCREASE UNDULY?

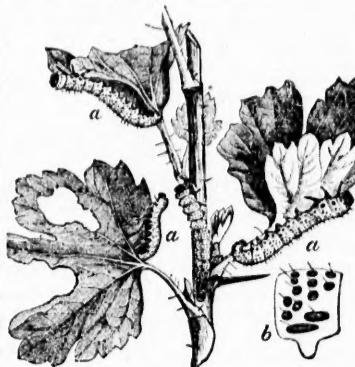
Under a combination of favorable circumstances, insect tribes will increase, in some instances to an alarming extent, and then, after a time of ascendancy, dwindle away till they all but disappear. The introduction of



Imported Currant Worm.
Leaf showing eggs (1), and holes which the young worms make (2).

a species from a distant place is usually followed by a rapid increase of that species. This probably is largely owing to the absence of the natural counter-checks to its kind, *ichneumons*, &c.

An English naturalist, on his arrival in this country some years ago, could not fail to notice the paucity of white butterflies. A few specimens of *Pieris oleracea* would be all that he could meet with. But about the year 1858 the smaller Cabbage Butterfly (*Pieris rapae*) was introduced from Europe, probably in cabbages thrown out from the steamships. In a few years it overspread the land, and great was the consternation it excited. I knew a farmer who, having noticed the exuviae of the



Imported Currant Worm.
a, a, a, larvae; *b,* a magnified joint of body showing black tubercles.

caterpillars on his cabbages, would not keep the vegetables for his own consumption but kindly vended them in the neighboring villages, because, as he told his friends in confidence, *he was sure they were unfit for food.*

The introduction of the English House Fly to New Zealand was followed by so startling an increase as to attract the notice even of the Maories, who, in one of their songs, says—

“As the Pakeha fly has driven out the Maori fly,
As the Pakeha grass has killed the Maori grass,
As the Pakeha clover has slain the Maori fern,
So will the Pakeha destroy the Maori.”

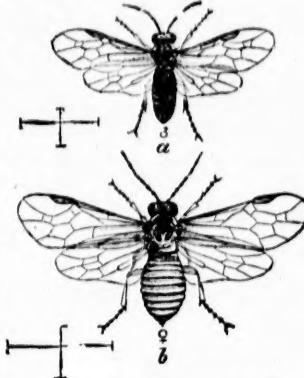
In America we have had never-to-be-forgotten instances of the rapid increase of imported insects, in the Hessian fly—supposed to have been brought over in straw, to Staten Island, by the troops under Sir W. Howe, and the Potato Beetle—for the migration of which, from the slopes of the Rocky Mountains, settlers unwittingly bridged the prairies.

The Acclimatisation Society has not accomplished unmixed good. The dreaded Phyloxera, which is ravaging the vineyards of Europe, is believed to have been carried there with new varieties of vines from America.

The opening up of a country increases the numbers of many of the insect tribes; and so does a succession of fine seasons.

Insectivorous creatures should be protected.

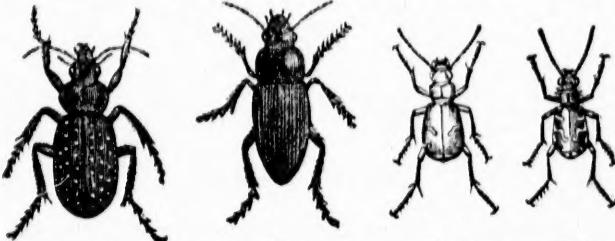
The destruction of predatory tribes of animals, birds, and insects, is often followed by a dangerous increase of the plant consumers. The man who shoots the woodpeckers may look for an increase of destructive “borers”; and he who drives away the Tits may expect trouble from a variety of pests. Once upon a



Imported Currant Worm (*Nematus ventricosus*)—Klug.
a, male; *b*, female, the hair lines showing natural size.

time the farmers of Rhode Island having waged successful war against the Purple Grackle were brought to see the folly of their proceedings by the rapid increase of the grubs of Melolonthadæ, and other beetles, which destroyed their meadows by consuming the roots of the grasses, rendering it necessary for them to import hay in large quantities. It is not generally known that the skunk consumes numbers of these troublesome beetles in their imago or perfect state.

Among the predatory insects which may be ranked as the



No. 1. 1. Fiery Ground Beetle (*Calosoma Calidum.*) 2. Musky Ground Beetle (*Harpalus Caliginosus.*) 3. Purple Tiger Beetle (*Cicindela purpurea.*) 4. Hairy necked Tiger Beetle (*Cicindela Hirticollis.*)

gardener's friends, distinguished places are held by the Ground Beetles (*Carabidae*), and Tiger Beetles (*Cicindelidae*); by the Ichneumons (*Ichneumonidae*), and Sand Wasps (*Sphegidae*), &c.,



No. 5. 5, 6. Lacewinged Fly. (*Chrysopa.*) Egg, Larva and Fly. 7. Spotted Lady-bird (*Hippodamia Maculata.*) 8. 13-spotted Lady-bird (*Hippodamia tredecimpunctata.*)

which prey on larvae; by the *Proctotrupidae*, which destroy the eggs of insects; by the Hawk-flies (*Syrphidae*), Lace-winged flies (*Hemerobiidae*), and Lady-birds (*Coccinellidae*), which prey on plant-llice.

The larger caterpillars that infest the orchard and garden are particularly liable to attacks from ichneumons. I have seen fifty ichneumon grubs bite their way through from the inside of a *Smerinthus* larva. On examining a cocoon of *Attacus Cecropia*, I have found the whole space, which should have been filled with the pupa of the moth, occupied by a compact mass of ichneumon cocoons.

SOME OF THE LARGER INSECTS FREQUENTING THE ORCHARD AND GARDEN WHICH HAVE APPARENTLY BECOME MORE NUMEROUS IN THE E. T. IN THE LAST FEW YEARS.

PHILAMPELUS ACHEMON.

This creature, in the larva state, grows to be three or four inches long. It is remarkable for the swollen appearance of the fourth segment of its body, and for the power which it has of protruding and drawing in its head and first three segments. Caterpillars of like build are known in England by the names of *Elephant* and *Hog* caterpillars. The creature loses its horn in an early stage of its existence, but retains a raised spot where the horn fell away. Its natural food is the Virginia Creeper (*Ampelopsis quinquefolia*), but as its name (*Φιλάμπελος*) implies, *it loves the vine*.

A very beautiful and perfect specimen of the moth was taken two or three years ago, in a frame, at the foot of a large vine in the garden of Col. Hall, at East Farnham. Last season the caterpillars were rather numerous in this neighborhood.

CHÆROCAMPA PAMPINATRIX.

This species is closely allied to the preceding. I have taken the caterpillar in Brome feeding on the Creeper. In Ontario it does much mischief, but in the E T. it is at present a rarity. In color it is green or brown; and it has a row of orange spots on the back. Its fourth and fifth segments are much swollen, and its head is very small. Its appearance suggested its name—*Chœrocampa* (*χοιρος*—a pig, *καπη*—a caterpillar). It is one of the “Hog Caterpillars.”

SPHINX QUINQUEMACULATA.

THE TOMATO WORM.

The larva of the Five Spotted Hawk Moth is one of those called Sphinx Caterpillars from the resemblance which they are supposed to bear to the Egyptian Sphinx. Under the name "Tomato Worm" it has been much vilified by newspaper correspondents. Beyond, however, feeding upon our tomatoes and other Solanaceous plants it does us no hurt. It is green, and has transverse side-lines of a lighter shade. Its spiracles are conspicuous, and it has a horn of formidable appearance. It grows to be three inches or more in length. As is the case with most of the sphinges the position of the Tomato Worm is often betrayed by the accumulations of its peculiarly moulded excrement. When full-fed the creature descends into the earth, and there forms a cist in which to pass the pupa stage of its existence. The chrysalis has a remarkable proboscis-case resembling the handle of a pitcher. The moth is a very large grey moth having five yellow spots along each side of the abdomen.

SPHINX SALVIE.

THE SAGE WORM.

This insect attains its full growth in September. As I have not met with an account of the larva in any of the Entomological works I have seen, I will describe it minutely. It is sepia-colored—slightly granulated like "Shagreen," and has a varnished appearance. Its anal horn is black, and rather small. The first segments to a limit beyond the pro-legs are horn-colored and semi-transparent, bearing two black, shield-shaped spots, the hinder of which is much larger than the former. The pro-legs are black. The creature has whitish transverse side-lines—the hindmost being broader than any of the others. The spiracles are black. The head has two longitudinal whitish lines.

The moth in some respects resembles the Zebra Hawk Moth (*Sphinx Kalmiae*); but its general coloring is much darker. It is the *Sphinx eremita*, of Hulner; the *S. Sordida*, of the Smithsonian catalogue.

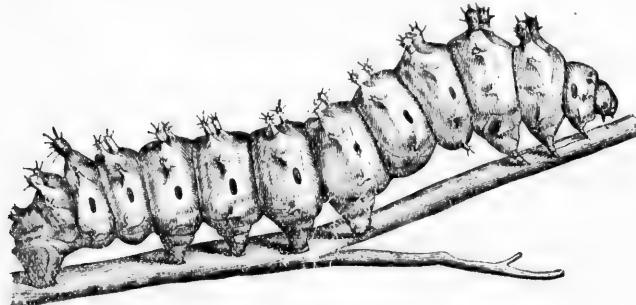
SMERINTHUS EXCÆCATUS.
THE BLIND-EYED SMERINTHUS.

The *Excæcatus* caterpillar, which feeds on the apple-tree, and sometimes damages young trees in the nursery, may be known by its granulated appearance and its triangular head. It is of a light green, and has a stout horn. The moth is a beautiful object, and has rosy hind wings, ornamented with eye-like spots.

Of the other members of the family *Smerinthus*, I have taken in this neighborhood *S. Geminata*, *S. Myops*, *S. Juglandis*, and *S. Cerisyi*. They feed on various trees that are met with round our homesteads, but can hardly be said to be injurious. The last named is one of our rarest moths.

ATTACUS CECROPIA.

The caterpillar of this magnificent insect is the largest of those that attack our apple-trees. It will thrive also on the plum and the cherry. It grows to be four inches in length, and as thick as a man's thumb. In color, it is bright green, and it is ornamented with egg-shaped warts set with short, black spines, and variously colored—coral-red, yellow, and blue. It is a voracious feeder. A



The *Cecropia* Caterpillar.

friend of mine observed the growth of three individuals of the species daily, till they reached their full size. They were feeding on an apple-tree outside his window; and, in the still summer evenings, the sound of their munching was plainly heard from his

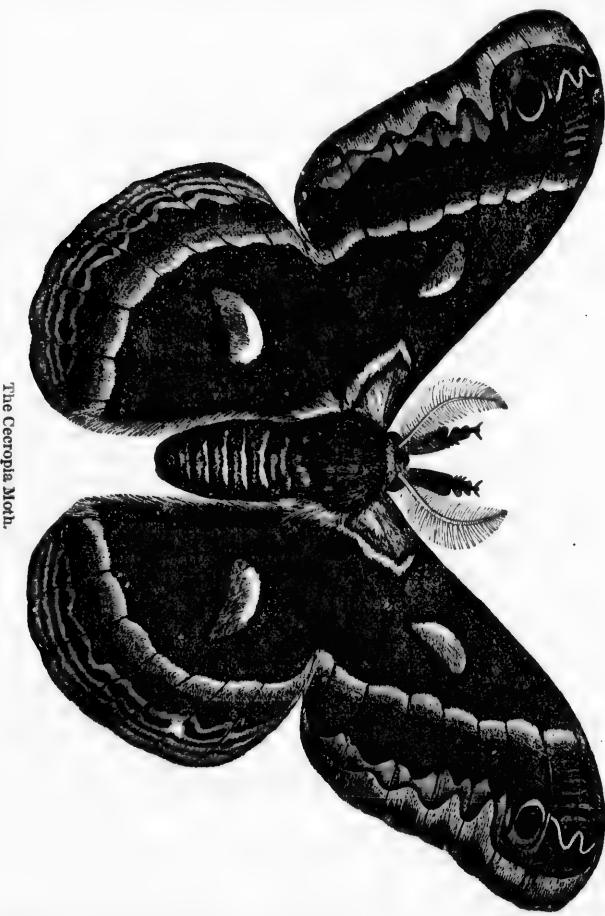
position twenty feet away. These insects afforded him opportunities for witnessing the progress of sloughing. After the head was freed, the skin was worked backward. First one segment of the body was expanded and contracted alternately, till quite free, then the next, and so on, till the change of dress was completed. The skin even of the small spines on the warts of the creature came away. The whole process occupied 20 minutes.

The cocoon of *Attacus Cecropia* is a marvel of comfortable security. The creature, when spinning it, has the power of assimilating it, in color, to surrounding objects. I have before me a cocoon which was spun by a larva confined in a white box, and is itself perfectly white, and another, which is of the warm brown of the bark and dried leaves of the red cherry tree to a twig of which it was attached.

I saw, when a boy, a case of these insects and their cocoons, in the Crystal Palace Exhibition, in Hyde Park, where attention was drawn to them with a view to a possible silk-manufacture. So long ago as 1759, the Rev. S. Pullein make silk stockings from *Cecropia* silk, and published his observations in the Philosophical Transactions of the Royal Society. The obstacle in the way of utilizing the silk seems to be the difficulty of unwinding the cocoons. It has been suggested that they should be soaked in weak lye, to which slaked lime has been added; and that the silk should be heckled and spun. The cocoons of a near relative of *Cecropia*, the Ailanthus moth (*Attacus ricini*), of Farther India, which feeds on the Palma Christi (*Ricinus communis*), are carded and spun like cotton, and the stuff formed from them is of incredible durability.

Attacus Cecropia, in its perfect state, is a beautiful and stately object. Its prevailing colors are black, white, and Indian red, and these are presented both in broad contrasts and harmonious blendings, in a variety of cloudings, wavelets, lunes and spots. But owing to its nocturnal habits, the creature is seldom seen. The nearest approach that many a one has made to an acquaintance with the *Cecropia* moth, has been the noticing of a bat-like object flitting through the gloom of a summer night.

These six are the largest caterpillars that usually trouble our



The Cecropia Moth.

gardens and orchards in the Province of Quebec. As in their perfect state some of the insects would be looked upon as *desiderata*

ble our
by many an entomologist, I would recommend horticulturists not to crush them out of existence when they fall in with them, but to pack them off uninjured to some entomologist of their acquaintance. By so doing they will, possibly, both save their trees and advance the cause of science.

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